



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/517,244

12/07/2004

Hiroyuki Morioka

112857-402

3110

29175

7590

06/03/2009

K&L Gates LLP
P. O. BOX 1135
CHICAGO, IL 60690

EXAMINER

WARTALOWICZ, PAUL A

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/03/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/517,244	Applicant(s) MORIOKA ET AL.	
	Examiner PAUL A. WARTALOWICZ	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 43-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 43-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 4/1/09 have been fully considered but they are not persuasive.

Applicant argues that Percharyl is entirely directed to releasing hydrogen from its hydride during ball mixing and that the Patent Office admits that the catalyst cannot be present on the surface of the aluminum hydride until after the ball mixing.

However, it appears that the instant invention is directed to the same process-- releasing hydrogen through doping with a catalyst during mixing (Example 4). As stated in the Advisory Action, it appears that the catalyst would be present on the surface of the hydride as a result of mixing. It appears that at least some of the catalyst would be present on the surface of the hydride during mixing, or as mixing just begins.

Additionally, it appears that the catalyst is present "on the surface" of at least some of the hydride as soon as the catalyst is put into contact with the hydride. There does not appear to be a special chemical bond denoted by the limitation "on the surface" such that as soon as the catalyst is put into contact with the hydride, at least some of the catalyst would be abutting the hydride and therefore be present on the surface of the hydride.

It appears that Applicant is arguing that the catalyst is only present on the surface of the hydride after ball milling and that after ball milling, the hydride mixture contains only 0-2.7% hydrogen.

However, it appears that the catalyst would be present, in at least some quantities, just as ball mixing begins and when hydrogen release for the mixture is at a maximum. At this point, at least some of the catalyst is present on the surface of the hydride and the hydride is capable of releasing more than 5.6% hydrogen. Additionally, the claims only require that the material is capable of releasing more than 5.6% weight of hydrogen. It appears that because at that moment in time the mixture of the prior art is substantially similar to the mixture of the claimed invention such that the mixture of the prior art has substantially similar properties as the mixture of the claimed invention, including being capable of releasing more than 5.6% hydrogen. It is noted that the instant invention is releasing hydrogen in the same manner (Example 4, *inter alia*).

Additionally, the claim does not require that the final mixture, after ball milling, can release greater than 5.6% weight of hydrogen. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., final mixture, after ball milling, capable of releasing greater than 5.6% weight of hydrogen) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that Percharsky fails to teach thermally decomposing the aluminum hydride by heating the hydrogen occluding material to a temperature of greater than 100°C.

Art Unit: 1793

However, Percharsky teaches carrying out the method of releasing hydrogen gas at a temperature of 100°C and the claim requires that the temperature is greater than 100°C and less than 200°C (e.g. 100.01°C). The prior art range is so close that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 43-46 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pecharsky et al. (6773692).

Pecharsky disclose the instantly claimed hydrogen occluding material and the method of using the hydrogen occluding material. Pecharsky teaches a solid hydride of formula AlH_3 (Column 4, lines 11-28, line 24 in particular) and that the hydride releases hydrogen at temperature in the range from -200°C to about 100°C (Column 4, line 65 through Column 5, line 5) in an inert atmosphere (col. 5). Pecharsky also teaches the use of a catalyst in combination with the hydride, the catalyst selected from metals belonging to periods III to V of the periodic table (Column 4, lines 42-52), that the catalyst and hydride are powders (Column 5, line 6), and also that the catalyst is present in an amount of about 0.1-25 mol%, about 1-15 mol%, or even about 3-5 mol% (Column 4, lines 53-64).

Additionally, it appears that Pecharsky discloses a hydride that does not have alkali metals (col. 4, lines 11-18, $x=0$) comprising a solid hydride of formula AlH_3 (Column 4, lines 11-28, line 24 in particular).

As to the claim limitations wherein the hydrogen release occurs in one step, the materials of Pecharsky appear to be the same as those that are claimed and therefore would inherently exhibit the same hydrogen capacity.

Pecharsky disclose the instantly claimed hydrogen occluding material and the method of using the hydrogen occluding material as described with respect to claims 27 and 28 above.

If the teachings of Pecharsky as described above do not anticipate the instantly claimed limitations, they would be obvious because Pecharsky specifically teaches that the catalyst to be included in the material is a transition metal, and specifically comprises “a transition metal of the 3rd (Sc through Zn), the 4th (Y through Cd), or the 5th (Hf through Hg) period of the periodic table, or lanthanide elements (La through Lu), or their derivatives, or mixtures thereof” and that titanium is preferred in Column 4, lines 42-52. This teaching includes not only groups III-V of the periodic table but also includes titanium.

Additionally, one of ordinary skill in the art at the time applicant's invention was made would have recognized to use Ti as a dopant through routine experimentation.

It appears that the catalyst would be present, in at least some quantities, just as ball mixing begins and when hydrogen release for the mixture is at a maximum. At this point, at least some of the catalyst is present on the surface of the hydride and the hydride is capable of releasing more than 5.6% hydrogen. Pecharsky teaches that at the end of ball milling, the composition contains 0% hydrogen (col. 9). Therefore, it appears that the hydrogen release occurs in one stage (during ball mixing).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pecharsky et al. (6773692).

Pecharsky disclose the instantly claimed hydrogen occluding material and the method of using the hydrogen occluding material. Pecharsky teaches a solid hydride of formula AlH_3 (Column 4, lines 11-28, line 24 in particular) and that the hydride releases hydrogen at temperature in the range from -200°C to about 100°C (Column 4, line 65 through Column 5, line 5) in an inert atmosphere (col. 5). Pecharsky also teaches the use of a catalyst in combination with the hydride, the catalyst selected from metals belonging to periods III to V of the periodic table (Column 4, lines 42-52), that the catalyst and hydride are powders (Column 5, line 6), and also that the catalyst is present in an amount of about 0.1-25 mol%, about 1-15 mol%, or even about 3-5 mol% (Column 4, lines 53-64).

Additionally, it appears that Pecharsky discloses a hydride that does not have alkali metals (col. 4, lines 11-18, $x=0$) comprising a solid hydride of formula AlH_3 (Column 4, lines 11-28, line 24 in particular).

As to the claim limitations wherein the hydrogen release occurs in one step, the materials of Pecharsky appear to be the same as those that are claimed and therefore would inherently exhibit the same hydrogen capacity.

Pecharsky disclose the instantly claimed hydrogen occluding material and the method of using the hydrogen occluding material as described with respect to claims 27 and 28 above.

If the teachings of Pecharsky as described above do not anticipate the instantly claimed limitations, they would be obvious because Pecharsky specifically teaches that the catalyst to be included in the material is a transition metal, and specifically comprises “a transition metal of the 3rd (Sc through Zn), the 4th (Y through Cd), or the 5th (Hf through Hg) period of the periodic table, or lanthanide elements (La through Lu), or their derivatives, or mixtures thereof” and that titanium is preferred in Column 4, lines 42-52. This teaching includes not only groups III-V of the periodic table but also includes titanium.

Additionally, one of ordinary skill in the art at the time applicant's invention was made would have recognized to use Ti as a dopant through routine experimentation.

Pecharsky teaches carrying out the method of releasing hydrogen gas at a temperature of 100°C and the claim requires that the temperature is greater than 100°C and less than 200°C (e.g. 100.01°C). The prior art range is so close that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

It appears that the catalyst would be present, in at least some quantities, just as ball mixing begins and when hydrogen release for the mixture is at a maximum. At this point, at least some of the catalyst is present on the surface of the hydride and the hydride is capable of releasing more than 5.6% hydrogen. Percharsky teaches that at the end of ball milling, the composition contains 0% hydrogen (col. 9). Therefore, it appears that the hydrogen release occurs in one stage (during ball mixing).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
May 27, 2009

/Stanley Silverman/
Supervisory Patent Examiner, AU 1793